

REMARKS

Claims 1-8, 11-16, and 18-21 are pending in the instant application, with claim 1 in independent form. Claim 8 is currently amended to specify the value of variable “k” in the formula as being 0, 1, 2, or 3, which amendment was previously discussed with and approved by the Examiner. No claims are currently added or cancelled. Claims 9-10 and 17 were previously cancelled.

In the instant Office Action, the Examiner has requested affirmation of the claim election for Group I, claims 1-8, 11-16, 18, and 21 that was previously made over the telephone. The Applicants hereby affirm the election of Group I, claims 1-8, 11-16, 18, and 21 without traverse. The Examiner has acknowledged the Applicants’ claim for foreign priority, but the Examiner has noted that Applicants have not filed a certified copy of the foreign priority document as required by 35 U.S.C. §119(b). The Applicants respectfully submit that the claim for foreign priority in the instant application is valid, and that it is unnecessary for the Applicants to file a certified copy of the foreign priority document to properly claim priority thereto. While it is true that 35 U.S.C. §119(b) empowers the Director to require a certified copy of the original foreign application as the Director deems necessary, no such requirement has been made of the Applicants in the present case and no circumstances have arisen that warrant filing of a certified copy of the original foreign application at this time.

Claims 1-5, 7, 8, 11-13, 15, 16, and 21 stand rejected under 35 U.S.C. §103(a) as being unpatentable over Bao et al. (U.S. Pre-Grant Pub. No. 2004/0231781) in view of Clem et al. (U.S. Patent No. 6,518,168). Claim 6 stands rejected under 35 U.S.C. §103(a) as being unpatentable over Bao et al. and Clem et al. as applied to claim 1 in further view of Spence (U.S. Patent No. 6,083,355). Claims 14 and 18 stand rejected under 35 U.S.C.

§103(a) as being unpatentable over Bao et al. and Clem et al. as applied to claim 1 in further view of Nomura et al. (U.S. Pre-Grant Pub. No. 2003/0211342). For the reasons set forth below, the Applicants respectfully traverse the rejection of independent claim 1, as well as the claims that depend therefrom, over Bao et al. in view of Clem et al. on the basis that these objections are improper and must be withdrawn. The Applicants further submit that the Examiner's rejection of claim 6 that further relies upon the teachings of Spence is also improper and must be withdrawn.

As to the Rejections of Claim 1 Under 35 U.S.C. §103(a) Over Bao et al. in View of Clem et al.

Independent claim 1 is directed to a method of applying a patterned thin-film onto a substrate and includes the steps of i) plasma treating the substrate, ii) applying a liquid coating material comprising various silicon-containing polymers onto the substrate surface by a soft lithographic technique, and iii) removing residual liquid coating where required, with the liquid coating material not required to undergo a curing step. The Examiner has turned to Bao et al. as teaching i) plasma treating a substrate and ii) applying a liquid coating material comprising an organic polymer onto the substrate surface by a soft lithographic technique. Recognizing that Bao et al. fails to teach applying a liquid coating material **comprising a silicon-containing polymer** onto the substrate, the Examiner has turned to the teachings of Clem et al. as teaching a soft lithographic technique to deposit silicon-containing monomers on a substrate. Recognizing further that Clem et al. fails to teach applying a liquid coating material comprising various silicon-containing **polymers** onto the substrate, the Examiner has opined that “[a]t the time of the invention, it would have been *prima facie* obvious to one of ordinary skill in the art to use the monomers of

Clem et al. and polymerize them before stamping (μ CP) the pattern onto the substrate because, “This polymer inking technique has several advantages over other high throughput patterning techniques such as μ CP and NIL’.” The Applicants respectfully submit that the Examiner’s rejections fail to properly account for what one of ordinary skill in the art would reasonably expected to have been able to do in view of the combined teachings of Bao et al. and Clem et al. such that the Examiner has failed to establish *prima facie* obviousness of independent claim 1 in view of the combined teachings of Bao et al. and Clem et al.

The Applicants provide the relevant standards for establishing *prima facie* obviousness of the instant claims. As the Examiner is likely aware, *Graham v. John Deere*, 383 US 1, 148 USPQ 459 (1966) provides the basic framework for performing obviousness analyses. As the Examiner is also likely aware, the Supreme Court reaffirmed the standards set forth in *Graham v. John Deere* in the decision of *KSR International Co. v. Teleflex Inc.* (KSR), 550 U.S. 398, 82 USPQ2d 1385 (2007). It is well established that 35 U.S.C. §103 forbids issuance of a patent when “the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains.” *KSR Int’l Co. v. Teleflex Inc.*, 127 S.Ct. 1727, 1734, 82 USPQ2d 1385, 1391 (2007). In *KSR*, the Court noted that “[t]o facilitate review, this analysis should be made explicit.” *KSR*, 127 S.Ct. at 1740-41, 82 USPQ2d at 1396. (“[R]ejections on obviousness grounds cannot be sustained by mere conclusory statements; instead, there must be some articulated reasoning with some rational underpinning to support the legal conclusion of obviousness”). When making an obviousness rejection, Office personnel must therefore ensure that the written record includes findings of fact

concerning the state of the art and the teachings of the references applied, and it is appropriate to include explicit findings as to how a person of ordinary skill would have understood prior art teachings, or what a person of ordinary skill would have known or could have done. See MPEP 2141(II.). In fact, as succinctly summarized in MPEP 2141(II.), the focus when making a determination of obviousness should be on what a person of ordinary skill in the pertinent art **would have known at the time of the invention, and on what such a person would have reasonably expected to have been able to do in view of that knowledge** (emphasis added). The above standards are consistent in spirit with the fact that “one cannot show nonobviousness by attacking references individually where the rejections are based on combinations of references”, citing *In re Keller*, 642 F.2d 413, 208. Indeed, “[the prior art] must be read, not in isolation, but for what it fairly teaches in combination with the prior art as a whole”, citing *In re Merck & Co., Inc.*, 231 USPQ 375, 380 (CAFC 1986). In this regard, the ultimate obviousness analysis must clearly focus on what one of ordinary skill in the art would reasonably have been expected to do in view of the combined teachings of the prior art references at issue.

The Applicants acknowledge that the Examiner has provided an articulated reasoning to support the obviousness rejection of independent claim 1 over Bao et al. in view of Clem et al. However, the Applicants respectfully submit that the Examiner’s reasoning does not accurately reflect the knowledge that one of ordinary skill in the art would have known at the time of the invention of claim 1 based upon the combined teachings of Bao et al. and Clem et al.

First, the Applicants refer to the Background of the Invention section of the instant application, which provides detail regarding the difficulties experienced in the art with regard to successfully printing preformed siloxane polymers (see paragraph [0010] in the original application as filed).

With those of ordinary skill in the art being aware of the difficulties associated with successful printing of preformed siloxane polymers at the time of the instant invention, the Applicants note that the advantages of the process Bao et al. have little, if any, relation to the type of polymer ink used in the process. Rather, the advantages of the process of Bao et al. **are primarily connected to a selective surface treatment technique in which protrusion surfaces and recess sidewalls/bottoms of a mold are treated with surface energy modifiers to have different surface energies** (see paragraph [0050] on page 4 of Bao et al.). Referring to paragraph [0047] on page 3 of Bao et al., the differences in surface energies between the recess sidewalls/bottoms and the protrusion surfaces enables polymer ink on the protrusion surface to be inked to the substrate with smooth edges.

It is notable that Bao et al. focuses upon use of various silanes to treat different surfaces of the mold and modify the surface energy thereof (see paragraphs [0054]-[0058] on pages 4 and 5 of Bao et al. While Bao et al. provides lengthy descriptions of silicon-containing materials as suitable for surface treating the mold, silicon-containing materials are *clearly* omitted from the listing of suitable polymer inks that can be utilized in the context of Bao et al. As such, it is clear from the disclosure of Bao et al. that silicon-containing polymers were expressly considered during development of the invention, but were omitted from the listing of suitable polymer inks for use in the process of Bao et al. One of skill in the art, considering Bao et al. for its teachings as a whole, would instantly

recognize the omission of silicon-containing materials from the listing of suitable polymer inks of Bao et al. as being an indication that silicon-containing materials are **not** suitable for polymer inks to be used in the process of Bao et al.

Given the reliance upon modulation in surface energies between protrusions and recesses in the molds to obtain the advantageous pattern features in accordance with the process of Bao et al., it is clear that surface energy of the polymer inks is an important consideration for determining whether there is a reasonable expectation of success in using any particular ink in the process of Bao et al. After all, low surface energy of the polymer ink would logically minimize the effect of the different surface energies of the mold treatment in the various locations of the mold. Due to the low surface energies of silicon-containing materials, the Applicants respectfully submit that one of ordinary skill in the art would **not** reasonably have a reasonable expectation of success with using silicon-containing materials as polymer inks in the process of Bao et al. Coupled with the explicit disclosure of silicon-containing materials as suitable for the surface treatment, the omission of silicon-containing materials from the listing of suitable polymer inks in Bao et al. provides substantial evidence that a person of ordinary skill in the art would **not** have reasonably been expected to utilize silicon-containing polymers in the process of Bao et al.

The Applicants respectfully submit that the teachings of Clem et al. provide no redeeming teachings for the Examiner to find obviousness of independent claim 1 in view of the teachings of Bao et al. as summarized above. As the Examiner has recognized, Clem et al. *does not even* teach silicon-containing polymer inks for use in the process taught therein. Rather, Clem et al. teaches silicon-containing monomers for use in the process thereof. While the Examiner has opined that it would be obvious to one of ordinary skill in

the art to use the monomers of Clem et al. and polymerize them before stamping a pattern on the substrate based upon the teachings of Bao et al., there is no basis for the Examiner's position in view of the fact that the advantages of the process of Bao et al. stem from the surface treatment of the mold and **not** the polymer ink that is used in the process. Further, the silicon-containing monomers of Clem et al. must react with polar functionalities that are exposed after plasma etching to form the self-assembled monolayers in the process of Clem et al. (see column 14, lines 44-47). Thus, one of skill in the art would clearly recognize that polymerization of the silicon-containing monomers of Clem et al. **before** stamping the pattern on the substrate would destroy to mechanism by which the monolayers form in the context of Clem et al.

In view of the foregoing, the Applicants respectfully submit that the Examiner has failed to establish *prima facie* obviousness of independent claim 1 in view of the combined teachings of Bao et al. in view of Clem et al. As such, the Applicants respectfully submit that the rejections of independent claim 1 and the claims that depend therefrom under 35 U.S.C. §103(a) over Bao et al. in view of Clem et al. are overcome and must be withdrawn.

As to the Rejection of Dependent Claim 6 Under 35 U.S.C. §103(a) Over Bao et al. and Clem et al. in View of Spence

In addition to the arguments set forth above, the Applicants further respectfully submit that the rejection of claim 6 is completely without basis. While Bao et al. and Clem et al. teach various plasma processes, and while Spence teaches an atmospheric pressure plasma discharge, none of those references teach introducing an atomized liquid and/or solid coating-forming material into an atmospheric pressure plasma discharge. Because the Examiner must account for each and every element in a claim to establish a *prima facie*

case of obviousness against the claim, the Applicants respectfully submit that the Examiner has failed to properly establish a *prima facie* case of obviousness of dependent claim 6 over the combined teachings of Bao et al., Clem et al., and Spence.

The Applicants respectfully submit that all rejections of the claims are overcome such that independent claim 1, as well as the claims that depend therefrom, is in condition for allowance, which allowance is respectfully requested.

The appropriate fees for a one-month extension of time and a Supplemental IDS are included herewith. While it is believed that no further fees are presently due, the Commissioner is authorized to charge our deposit account no. 08-2789 for any additional fees or credit the account for any overpayment.

Respectfully submitted,

HOWARD & HOWARD ATTORNEYS, PLLC

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Date

/Christopher S. Andrzejak/
Christopher S. Andrzejak, Reg. No. 57,212
450 West Fourth Street
Royal Oak, MI 48067-2557
(248) 723-0438